Remarks

Claims 1, 3-13, and 15-21 are pending in the subject application. By this Amendment, Applicants have canceled claims 1, 3-13, and 15-21 and added new claims 22-42. Support for the new claims can be found throughout the subject specification and in the claims as originally filed. Entry and consideration of the amendments presented herein is respectfully requested. Accordingly, claims 22-42 are currently before the Examiner. Favorable consideration of the pending claims is respectfully requested.

As an initial matter, Applicants gratefully acknowledge the Examiner's withdrawal of the rejections under 35 USC §112, first paragraph, and 35 USC §103(b) (over Stout *et al.*).

Applicants note that the Office Action Summary page indicates that the drawings are objected to by the Examiner. However, in a telephonic conference conducted on June 28, 2002, the Examiner indicated that the objection to the drawings was made in error and that Figures 1A-B, 2A-B, and 3A-B submitted with Applicants' Amendment dated March 4, 2002 are accepted. Accordingly, reconsideration and withdrawal of the objection is respectfully requested.

By this Amendment, Applicants have amended the subject specification to include SEQ ID NOs. for the Rep protein and *Rep* gene sequences identified at page 5 of the specification. Applicants have also amended the subject specification to include a "Brief Description of the Sequences" section. A sequence listing in computer readable format and on paper is being submitted with this Amendment. I hereby certify that the paper and computer readable copies contain the same information and that no new material is added by this submission. Entry and consideration of the Sequence Listing is respectfully requested.

Claims 1, 3-13, and 15-21 are rejected under 35 USC §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Specifically, the Examiner asserts that the subject application does not provide written description for "fragments" of a Rep protein. Applicants respectfully assert that there is adequate written description in the subject specification to convey to the ordinarily skilled artisan that they had possession of the claimed invention. In addition, Applicants respectfully assert that an ordinarily skilled artisan could readily prepare polynucleotides encoding fragments of the Rep

protein and test those polynucleotides for the ability to confer resistance to infection using standard techniques known in the art and without resorting to undue experimentation. However, by this Amendment, Applicants have submitted new claims which do not refer to a fragment of the Rep protein. Applicants respectfully assert that the claims, as amended, are intended to cover, under the Doctrine of Equivalents, polynucleotides that encode fragments of the Rep protein. Accordingly, reconsideration and withdrawal of the rejection under 35 USC §112, first paragraph, is respectfully requested.

Claims 1-3, 5, 6, 9, 10, 12, 13, 15, and 17-20 are rejected under 35 USC §102(b) as anticipated by Brunetti *et al.* (1997). The Examiner asserts that the Brunetti *et al.* reference teaches expression of a truncated viral Rep protein in tomatoes which confers resistance to tomato yellow leaf curl virus. Applicants respectfully traverse this grounds of rejection.

Applicants respectfully assert that the Brunetti *et al.* reference does not teach or suggest the claimed invention for the reasons set forth in the Amendment dated March 4, 2002. In particular, Applicants respectfully maintain that, unlike the plants of the claimed invention, the phenotype of the transformed plants described in the Brunetti *et al.* reference is significantly altered such that the plants have little or no commercial value. However, in an effort to advance prosecution of the subject application to completion, the new claims submitted herein recite that the polynucleotide comprises a sequence that encodes a Rep protein of a tomato mottle geminivirus. Applicants note that previously pending claims 4, 11, and 16, which recite that the polynucleotide encodes a Rep protein of a tomato mottle geminivirus, are not included under this rejection. Accordingly, Applicants respectfully assert that the §102 rejection is moot in view of the new claims submitted with this Amendment. Reconsideration and withdrawal of the rejection under 35 USC §102(b) is respectfully requested.

Claims 1, 3-13, and 15-21 are rejected under 35 USC §102(e) as anticipated by Stout *et al.* (U.S. Patent No. 6,291,743). The Examiner asserts that the Stout *et al.* patent teaches expression of a *Rep* gene in tomatoes which confers resistance to tomato mottle virus and tomato yellow leaf curl virus. Applicants respectfully traverse this grounds of rejection.

Applicants respectfully maintain that the Stout *et al.* patent does not teach or suggest the use of a polynucleotide encoding a non-mutated tomato mottle geminivirus Rep protein for providing virus resistance in transgenic plants. Although, as the Examiner has pointed out in the Office Action, the Stout *et al.* patent may teach the production of infectious clones and vectors where the gene is not mutated, Applicants respectfully assert that these vectors did not provide the plant with resistance to viral infection. Applicants refer the Examiner to column 34, lines 1-6, of the Stout *et al.* patent, wherein it is stated: "The results show that non-lethal mutants do not exhibit detectable transdominant activity. While levels of transdominance varied among different AC1 mutants, **only** replication-lethal **mutants** exhibited transdominant interference." (emphasis added) Applicants respectfully submit that this statement in the Stout *et al.* patent teaches that only vectors that contained lethal mutations provided some level of virus resistance, whereas those constructs lacking mutations did not provide resistance. Thus, Applicants respectfully assert that the Stout *et al.* patent does not teach or suggest the claimed invention. Accordingly, reconsideration and withdrawal of the rejection under 35 USC §102(e) is respectfully requested.

It should be understood that these amendments have been made solely to expedite prosecution of the subject application to completion and should not be construed as an indication of Applicants' agreement with or acquiescence in the Examiner's position.

In view of the foregoing remarks and amendments to the claims, Applicants believe that the currently pending claims are in condition for allowance, and such action is respectfully requested.

The Commissioner is hereby authorized to charge any fees under 37 CFR §§1.16 or 1.17 as required by this paper to Deposit Account No. 19-0065.

Applicants invite the Examiner to call the undersigned if clarification is needed on any of this response, or if the Examiner believes a telephonic interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

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DRP/sl
Attachments: Marked-Up Version of Substituted Paragraph; New pages 1-3 (Sequence Listing) of the subject specification; Sequence Listing in computer readable format.

Marked-Up Version of Substituted Paragraph

Paragraph on page 5, beginning at line 2:

The subject invention concerns the use of a plant virus gene to transform a plant or plant tissue to confer resistance in the plant or plant tissue to infection from a plant virus. The methods of the subject invention can be used to confer resistance in a plant to infection by a plant pathogen such as, for example, a geminivirus. The method comprises transforming a plant with a polynucleotide such that when the polynucleotide is expressed in the plant the plant then exhibits resistance to infection by plant viruses. In one embodiment of the invention, a plant is transformed by wounding and agroinfection with an *Agrobacterium* containing a polynucleotide of the invention that is transferred to the plant upon agroinfection of the plant. Preferably, the polynucleotide used in the methods of the invention encodes a plant virus Rep protein or a mutant Rep protein, or a fragment or variant thereof. In an exemplified embodiment, the polynucleotide encodes a Rep protein of tomato mottle geminivirus (ToMoV) (SEQ ID NO. 2). The nucleotide sequence of a ToMoV (component A) virus is disclosed in [Genebank] Genbank having accession number L14460. Abouzid *et al.* (1992) disclose the nucleotide sequence of the ToMoV *Rep* gene (referred to therein as AL1 and corresponding to nucleotides 1523 to 7 of the sequence shown in Figure 1 of Abouzid *et al.* (1992) (SEQ ID NO. 1)). In another embodiment, the polynucleotide encodes a tomato yellow leaf curl virus (TYLCV-Is) Rep protein. The nucleotide sequences of several TYLCV-Is viral isolates are disclosed in [Genebank] Genbank, including isolates from Israel (accession number X15656), Cuba (accession number AJ223505), Dominican Republic (accession number AF024715), Egypt (accession number L12219), Jamaica (accession number U84146), Lebanon (accession number AF160875), Mexico (accession number AF168709) and Spain (accession number AJ223505).

SEQUENCE LISTING

<110> Polston, Jane
Hiebert, Ernest
Abouzid, Ahmed
Hunter, Wayne

<120> Materials and Methods for Producing Geminivirus Resistant Plants

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